PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2003P06374WO	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/GB2004/001962	International filing date *(day/month/year)* 06.05.2004	Priority date *(day/month/year)* 07.05.2003
International Patent Classification (IPC) or national classification and IPC B32B3/24, B32B5/28		
Applicant SIEMENS MAGNET TECHNOLOGY LTD.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 4 sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
04.10.2004	04.04.2005
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Stinchcombe, J Telephone No. +31 70 340-3679

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/GB2004/001962

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages	
1-16	as originally filed
Claims, Numbers	
1-20	received on 09.03.2005 with letter of 03.03.2005
Drawings, Sheets	
1/6-6/6	as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/GB2004/001962

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-21
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-21
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-21
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 The following document is referred to in this communication:
D1 : WO 00/09362 A (DAIMLER CHRYSLER AG ; BELACK KEVIN P (US)) 24 February 2000 (2000-02-24)

2 Document D1 is regarded as being the closest prior art to the subject-matter of independent claims 1 & 7, and shows (the references in parentheses applying to this document) a panel for the bodywork of a vehicle comprising multiple fibrous layers arranged about a balsa wood core layer (p 5 line 20 to p 6 line 4) having apertures therethrough (figs. 4 & 5) and subsequently impregnated with resin and then cured, as well as a method by which such a panel is produced in a mould (p 7 lines 6-21). The method employed is such that the matrix material would be continuous throughout the entire structure.

The subject-matter of claims 1 & 7 differs from this known panel in that a viscoelastic polymer is used instead of a balsa wood core layer.

The subject-matter of claims 1 & 7 is therefore new (Article 33(2) PCT).

3 The problem to be solved by the present invention may be regarded as how to provide a strongly vibration-damping panel.

The solution to this problem proposed in claims 1 & 7 of the present application is considered as involving an inventive step (Article 33(3) PCT) because, even though it is known that viscoelastic materials have vibration-damping properties, there is no motivation to actively replace the balsa wood core of the panel of D1 with a perforated viscoelastic polymer material. Therefore the solution proposed in the application is not obvious.

4 Claims 2-6, 8-17 & 21 are dependent on claims 1 & 7 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

5 Claims 18 & 19 contain no technical features in their own right. They have therefore been regarded as if they are claims dependent on the corresponding independent

claims independent claims 1 & 7. Based on this assumption, they also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VIII

Certain observations on the international application

Claims 18 & 19 are unclear within the meaning of Article 6 PCT, because they contain no technical features.

CLAIMS:

1. A composite material (10) for acoustic or mechanical damping, comprising: a plurality of layers of fibrous material (12) embedded in a structural matrix material (14); a layer (24) of viscoelastic polymer material between consecutive layers of fibrous material, said layer (24) of viscoelastic polymer material being bonded to the adjacent layers of fibrous material (12) embedded in the structural matrix material (14), characterised in that the layer (24) of viscoelastic polymer material is perforated, whereby the structural matrix material (14) is continuous through the perforations (34) between the adjacent layers of fibrous material (12) embedded in a the structural matrix material (14).

2. A composite material according to claim 1 wherein the perforations occupy 5-50% of the area of the layer (24) of viscoelastic polymer material.

3. A composite material according to any preceding claim wherein the structural matrix material (14) comprises a resin.

4. A composite material according to any preceding claim wherein the viscoelastic polymer material (24) comprises one of: polyurethane, polyester, polyethylene, PVC, and copolymers.

5. A composite material according to any preceding claim wherein the fibrous material (12) is glass fibre matting.

6. A composite material according to any preceding claim wherein a pure epoxy/glass fibre, or metal, layer is located on one surface of the composite material.

7. A method for producing a composite material (10) for acoustic or mechanical damping, comprising the steps of:

- providing at least one first, fibrous, layer (12; 26) impregnated with a first structural matrix material (14);
- stacking the at least one first, fibrous, layer on a former;
- providing at least one second layer (24) comprising a viscoelastic polymer material;
- stacking the at least one second layer on the stack of the first, fibrous, layer(s);
- providing at least one third, fibrous, layer impregnated with a second structural matrix material;
- stacking the at least one third layer on the stack of first and second layers; and
- simultaneously heating and compressing the resulting stack of first, second and third layers to cause the material of the second layer(s) to bond with the first and third layers, further comprising the step of perforating (34) the second layer(s) prior to the step of stacking the second layer(s), whereby the structural matrix material (14) is continuous through the perforations (34) between the adjacent layers of fibrous material (12) embedded in the structural matrix material.

8. A method according to claim 7 wherein the step of perforating comprises forming perforations with occupy 5-50% of the area of the second layer(s).

9. A method according to any of claims 7-8 wherein the viscoelastic polymer film material comprises one of: polyurethane, polyester, polyethylene, PVC and copolymers..

10. A method according to any of claims 7-9 wherein the step of heating and compressing is performed by enclosing the stack in a heat-shrinking material, and then heating the stack and the heat-shrinking material.

11. A method according to claim 10 wherein the heat shrinking material is polyamide tape.

12. A method according to any of claims 7-11 wherein the first and/or second structural matrix material comprises an epoxy, polyester or phenolic resin; or polyurethane.

13. A method according to any of claims 7-12 wherein the structural matrix material(s) includes thermo setting material, and the step of heating and compressing is effective to harden the thermosetting material.

14. A method according to any of claims 7-13 wherein the fibrous layers (12) comprise glass fibre matting.

15. A method according to any of claims 7-14 further comprising the step of selecting the direction of the fibres and fibre types in the fibrous layers (12) to provide a desired combination of structural strength, stiffness and damping properties.

16. A method according to any of claims 7-15 further comprising the step of providing a pure epoxy/glass fibre, or metal layer, on one surface of the composite material.

17. A method according to any of claims 7-16, wherein the layer of viscoelastic polymer material comprises a thermoplastic material, and the heating and compressing step is effective to diffuse or intermingle the thermoplastic material into the structural matrix material.

18. A material substantially as described and/or as illustrated in the accompanying drawings.

19. A method substantially as described.

20. A composite material according to any of claims 1 – 6 wherein a plurality of layers (24) of viscoelastic polymer material are provided, separated by separating layers (30) comprising fibrous material (12) and a structural matrix material (14).